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GEOLOGY AND PALÆONTOLOGY.

THE TEMPORARY DENTITION OF A NEW CREODONT.—The nature of the temporary dentition of the *Creodonta* has been hitherto unknown. As this point has an important bearing on the supposed relation of these animals to the *Mursupialia*, I give an account of it as seen in a new genus which has recently come under my observation:

Triïsodon quivirensis gen. et sp. nov. *Char. gen.*—Derived from the lower jaw. Probably only three premolars. True molars alike, consisting of three anterior cusps and a heel. The cusps are relatively small and the heel large. Of the former the internal is much smaller than the external, and the anterior is rudimental, being merely a projection of the cingulum. The cutting edges of the large external cusp are obtuse. The heel is basin-shaped, and its posterior border is divided into tubercles, of which the external is a large cusp. The fourth premolar has no anterior inner tubercle, so that the anterior part of the crown consists of a compressed cutting cusp. The heel has two well-developed posterior cusps. The third premolar has a similar principal trenchant cusp, but a smaller heel. Canines large.

This genus differs from *Herpetotherium* and *Ictops* in the simplicity of its fourth inferior premolar, and from *Stypolophus* and *Deltatherium* in the rudimental character of the accessory anterior cusps of the true molars, as well as in the three premolars. The rudimental anterior cusp of the true molars, with the three similar true molars, separates it from *Palæonyctis*, and the presence of a conic inner cusp of the same indicates it as different from *Amblyctonus* and *Periptychus*. It is not possible to state whether *Triïsodon* must be placed in the *Amblyctonidæ* or not, on account of the absence of the superior molar teeth.

This specimen of the type species of this genus is instructive as showing the succession of premolar teeth. Both the third and fourth premolars have temporary predecessors. The predecessor of the fourth premolar differs much from it in form, and is essentially identical in all respects with the true permanent molars. The crown of the predecessor of the third premolar is wanting, the roots only remaining in the jaw.

The permanent third premolar was protruded before the permanent fourth. Which temporary tooth of *Triïsodon* is homologous with the single one of the *Marsupialia* pointed out by Professor Flower?[1] As the additional permanent teeth of the placental *Mammalia* must have appeared later in time than the one already found in the implacentals, they must be those later protruded; hence the fourth tooth in the jaw of *Triïsodon* must be regarded as homologous with the fourth premolar of a placental, which is the last of that series to appear. If this be true, the tooth which follows the shed tooth of the Marsupials is not the fourth premolar, as supposed by Professor Flower, but the third premolar. This view is confirmed by the fact that the milk tooth displaced by the fourth tooth in *Triïsodon* resembles in all respects the true molars, just as the permanent tooth occupying the same position does in *Didelphys* and some extinct eocene genera. This goes to show that this tooth, permanent in marsupials, is temporary in placentals, and that, in spite of its form in the former group, it is the fourth premolar, and not the first true molar, as supposed by Professor Flower. Thus the posterior milk-molar of diphyodonts is a permanent tooth in the *Marsupialia*.

This observation confirms my conclusion that the *Creodonta* form a group intermediate between the *Marsupialia* and *Car-*

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[1] Transactions of the Royal Society, 1867, p. 631.

nivora.[1] I may add that in *Triïsodon* the inferior border of the lower jaw is not inflected posteriorly.

Char. specif.—Size about that of the wolf. Inferior canine directed upwards, its section nearly elliptic; a faint posterior, no anterior cutting edge. Fourth premolar rather large, with an anterior basal cingulum which is angulate upwards, and is not continued on the inner side of the crown. Cusps of the heel each sending a ridge forwards, the internal lower, obtuse and descending to base of inner side of large cusp; the external larger, with an acute anterior cutting edge continuous with the cutting edge of the large cusp. True molars with an external, but no internal basal cingulum. Border of heel with one large and three smaller tubercles, the former with, the latter without, anterior cutting edge. Enamel of all the teeth nearly smooth. All the cusps are rather obtuse. *Measurements.*—Length of inferior molar series: M. .080; long diameter of base of canine .013; length of true molar series .044; length of base of Prem. IV. .016; elevation of crown of do. .014; length of base of M. II. .016; width of do. in front .011. elevation of do., .014. The measurements of the jaw are not given, as the animal is not adult, the last molar not being yet protruded.

From the lower (? Puerco) Eocene beds of New Mexico.

Deltatherium absarokæ sp. nov. *Char. specif.*—This animal repeats very closely the characters of the *D. fundaminis*, but is much smaller in all its proportions. Both branches of the lower jaw accompany the anterior part of the skull, so that the dentition is well displayed. There are three inferior tubercular-sectorial molars, as in *Stypolophus*, but the fourth premolar has an internal tubercle, which is not found in that genus. The same tooth has a rudimental heel. The third inferior premolar is large, has a rudimental heel, and no inner lobe; the first premolar is two-rooted. There are only three inferior incisors. The superior molars are triangular, and the external posterior angle is not produced. The external cusp of the fourth posterior molar is compressed and simple, as in *Proviverra;* in *Stypolophus (Prototomus) viverrinus* and *S. multicuspis*, that tooth has a conic cusp and large posterior heel. The two posterior sides of the last superior molar are equal. Canines well developed. Enamel smooth.

Measurements.—Length of superior molar series: M. .0216; of superior true molars .0107. Diameters of second true molars: anteroposterior .0033; transverse .0055; width of jaws at same tooth .022; width between bases of canines .008; depth ramus mandibuli at Prem. I .005; at M. III .009. From the Wasatch Eocene of the Big Horn river; J. L. Wortman.—*E. D. Cope.*

A LARAMIE SAURIAN IN THE EOCENE.—It is known that in North America the saurians of the Laramie formation are mostly

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[1] See Proceedings American Philosophical Society, July, 1880.

Dinosauria, and that principally on this ground the formation has been referred to the Cretaceous series. A genus of uncertain affinity, *Champsosaurus* (*Simœdosaurus* Gerv.), has hitherto been regarded as peculiar to the Laramie. In France, however, it has been found by Dr. Lemoine near Reims, in the Suessonian Eocene, associated with *Mammalia*. I am now able to announce that the same association occurs in New Mexico in a formation which lies below the typical Wasatch Eocene, and which may be the Puerco. *Champsosaurus* is found imbedded in the same matrix with species of *Triïsodon*, *Periptychus*, *Hyracotherium*, and a species probably of *Phenacodus*. Portions of a dozen vertebræ were sent me, mingled with the teeth of the last-named mammal, and they appear to belong to one animal, and are unworn. As usual with vertebræ of the Laramie, the neural arches are lost. I describe the new species as follows:

Champsosaurus australis. Cervical vertebra distinguished by the superior transverse extent as compared with the longitudinal and vertical. The dimensions are about those of the *C. laticollis*. There is a similar median inferior low keel. The outline of the articular face for the neural arch is pyriform, the wide portion concave, with its external edge decurved. The decurvature is sometimes sufficient to resemble part of a rib-facet. Articular faces of centra nearly plane. Sides of centra very little concave, pierced by a foramen below the base of each diapophysis. Non-articular surfaces of centrum marked with a delicate thread-like sculpture. Diameters of cervical centrum: anteroposterior M. .012; vertical .014; transverse .017. Diameters of a dorsal: anteroposterior .013; vertical .012; transverse .015. The cervical vertebra is wider and more transverse than in either of the four known American species.—*E. D. Cope.*

COLORS OF GEOLOGICAL MAPS.—Professor Renevier, of Lausanne, general secretary of the commission appointed by the Geological Congress of Paris of 1878, to unify the colors of geological maps, makes a report which is published in the Bulletin of the Vaudoise Society of Natural Sciences. Sub-committees were appointed in the following countries: Germany, Spain, Portugal, Russia, France, Italy, Switzerland and the United States. The fullest reports were made by the Italian and French committees, and the colors they suggest are as follows:

	Italian.	French.
A. STRATIGRAPHIC SERIES (colors pale).		
Modern beds	White	White
Quaternary	Pale green	Pale green
Pliocene	Clear yellow	Mars red
Miocene	Reddish yellow	Reddish yellow
Eocene	Bistre	Pale yellow
Cretaceous	Green	Green
Jurassic	Blue	Blue
Liassic	Violet	Violet

	Italian.	French.
A. Stratigraphic Series (colors pale)—*Continued.*		
Triassic	Burnt sienna	Burnt sienna
Permian	Deep gray	Deep gray
Carboniferous		
Devonian	Rose brown banded	Deep brown
Silurian		
Crystalline	Rose carmine	Rose carmine
B. Eruptive Series.		
Granite	Deep carmine	Deep carmine
Porphyries	Saturn red	Orange yellow
Trachyte	Indian yellow	Indian yellow
Serpentine	Deep verdigris	Deep verdigris
Diorite	Deep blue	Deep blue
Melaphyre	Deep violet	Deep violet
Basalt	Deep bistre	
Modern lava	Deep red	Orange red
Volcanic tufas	Very pale blue	Very pale blue

Geological News.—Dr. Anton Fritsch's monograph of the Permian fauna of Bohemia, has advanced to the third part, including page 158. He describes the species of *Urocordylus*, *Ceraterpeton* and *Limnerpeton*. There are eleven plates and numerous phototypes in the text.——The annual distribution of the prizes of the Geological Society of London, at its annual general meeting, Feb. 18, 1881, was as follows: The Wollaston gold medal to Professor P. Martin Duncan, M.B., F.R.S., F.G.S.; the Murchison medal to Professor Archibald Geikie, F.R.S., F.G.S.; the Lyell medal for transmission to Dr. J. W. Dawson, F.R.S., F.G.S., of Montreal, by Mr. Worthington W. Smyth; the Bigsby medal to Dr. Charles Barrois, of Lille, to be transmitted by Professor Morris, F.G.S.; the remainder of the Wollaston donation fund to Dr. Ramsay H. Traquair, F.G.S., of Edinburgh, to be transmitted by Professor J. W. Judd, F.R.S., Sec. G.S.; the balance of the proceeds of the Murchison donation fund the president handed to Frank Rutley, F.G.S.; one portion of the moiety of the Lyell donation fund to G. R. Vine, Esq.; the second portion of the Lyell donation fund to Dr. Anton Fritsch, of Prague, by hand of Professor H. G. Seeley, F.R.S., F.G.S., for transmission.——The extensive silver ore deposit in South Western New Mexico recently examined by George Daly, proves to be of Middle Carboniferous age according to Prof. C. A. White. This palæontologist determines the following species as from the adjacent limestone: *Fenestella*, *Amplexus*, *Zaphrentis* and Crinoid species; *Orthis resupmoides* Cox; *O. ? michelini*, *Rhynchonella prolutosa* White.——A recent Cyprinid fish from China, having exactly the dental characters of the American Pliocene genus *Mylocyprinus* Leidy, has been recently described by Peters under a new generic name.